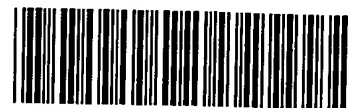


0590
0328

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RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/903,188A

DATE: 03/28/2002

TIME: 10:16:18

Input Set : N:\Crf3\Refhold\I903188.raw

Output Set: N:\CRF3\03282002\I903188A.raw

1 <110> APPLICANT: De Robertis, Edward M.
 2 Bouwmeester, Tewis
 3 <120> TITLE OF INVENTION: Endoderm, Cardiac and Neural Inducing
 4 Factors
 5 <130> FILE REFERENCE: 510015-258
 6 <140> CURRENT APPLICATION NUMBER: US/09/903,188A
 7 <141> CURRENT FILING DATE: 2001-07-11
 8 <150> PRIOR APPLICATION NUMBER: US 60/020,150
 9 <151> PRIOR FILING DATE: 1996-06-20
 10 <160> NUMBER OF SEQ ID NOS: 10
 11 <170> SOFTWARE: FastSEQ for Windows Version 3.0
 13 <210> SEQ ID NO: 1
 14 <211> LENGTH: 270
 15 <212> TYPE: PRT
 16 <213> ORGANISM: Xenopus
 17 <400> SEQUENCE: 1
 18 Met Leu Leu Asn Val Leu Arg Ile Cys Ile Ile Val Cys Leu Val Asn
 19 1 5 10 15
 20 Asp Gly Ala Gly Lys His Ser Glu Gly Arg Glu Arg Thr Lys Thr Tyr
 21 20 25 30
 22 Ser Leu Asn Ser Arg Gly Tyr Phe Arg Lys Glu Arg Gly Ala Arg Arg
 23 35 40 45
 24 Ser Lys Ile Leu Leu Val Asn Thr Lys Gly Leu Asp Glu Pro His Ile
 25 50 55 60
 26 Gly His Gly Asp Phe Gly Leu Val Ala Glu Leu Phe Asp Ser Thr Arg
 27 65 70 75 80
 28 Thr His Thr Asn Arg Lys Glu Pro Asp Met Asn Lys Val Lys Leu Phe
 29 85 90 95
 30 Ser Thr Val Ala His Gly Asn Lys Ser Ala Arg Arg Lys Ala Tyr Asn
 31 100 105 110
 32 Gly Ser Arg Arg Asn Ile Phe Ser Arg Arg Ser Phe Asp Lys Arg Asn
 33 115 120 125
 34 Thr Glu Val Thr Glu Lys Pro Gly Ala Lys Met Phe Trp Asn Asn Phe
 35 130 135 140
 36 Leu Val Lys Met Asn Gly Ala Pro Gln Asn Thr Ser His Gly Ser Lys
 37 145 150 155 160
 38 Ala Gln Glu Ile Met Lys Glu Ala Cys Lys Thr Leu Pro Phe Thr Gln
 39 165 170 175
 40 Asn Ile Val His Glu Asn Cys Asp Arg Met Val Ile Gln Asn Asn Leu
 41 180 185 190
 42 Cys Phe Gly Lys Cys Ile Ser Leu His Val Pro Asn Gln Asp Arg
 43 195 200 205
 44 Arg Asn Thr Cys Ser His Cys Leu Pro Ser Lys Phe Thr Leu Asn His

ENTERED

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TIME: 10:16:18

Input Set : N:\Crf3\Refhold\I903188.raw

Output Set: N:\CRF3\03282002\I903188A.raw

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45          210          215          220
46      Leu Thr Leu Asn Cys Thr Gly Ser Lys Asn Val Val Lys Val Val Met
47      225          230          235          240
48      Met Val Glu Glu Cys Thr Cys Glu Ala His Lys Ser Asn Phe His Gln
49          245          250          255
50      Thr Ala Gln Phe Asn Met Asp Thr Ser Thr Thr Leu His His
51          260          265          270
53 <210> SEQ ID NO: 2
54 <211> LENGTH: 1338
55 <212> TYPE: DNA
56 <213> ORGANISM: Xenopus
57 <400> SEQUENCE: 2
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59      atgtactcag gatctgtatt atcgtctgcc ttgtgaatga tggagcagga aaacactcag      120
60      aaggacgaga aaggacaaaa acatattcac ttaacagcag aggttacttc agaaaaagaaa      180
61      gaggagcacg taggagcaag attctgctgg tgaatactaa aggtcttgat gaaccccaca      240
62      ttgggcatgg tgatttttgc ttagtagctg aactatttga ttccaccaga acacatacaa      300
63      acagaaaaga gccagacatg aacaaagtca agcttttctc aacagttgcc catggaaaca      360
64      aaagtgcaag aagaaaagct tacaatgggt ctagaaggaa tatttttcct cgccgttctt      420
65      ttgataaaaag aaatacacag gttactgaaa agcctgggtc caagatgttc tggaacaatt      480
66      ttttggttaa aatgaatgga gccccacaga atacaagcca tggcagtaaa gcacaggaaa      540
67      taatgaaaga agcttgcaaa acctgtttt tcactcagaa tattgtacat gaaaactgtg      600
68      acaggatggt gatacagaac aatctgtgct ttggtaaatg catctctctc catgtttccaa      660
69      atcagcaaga tcgacgaaat acctgttccc attgcttgcc gtocaaattt accctgaacc      720
70      acctgacgct gaattgtact ggatctaaga atgtagtata ggttgcatg atggtagagg      780
71      aatgcacgtg tgaagctcat aagagcaact tccaccaaac tgcacagttt aacatggata      840
72      catctactac cctgcaccat taaaggactg ccatacagta tggaaatgcc cttttgttg      900
73      aatatttgtt acatactatg catctaaagc attatgttgc cttctatttc atataaccac      960
74      atggaataag gattgtatga attataatta acaaatggca ttttgtgtaa catgcaagat      1020
75      ctctgttcca tcagttgcaa gataaaaggc aatatttgtt tgactttttt tctacaaaat      1080
76      gaatacccaa atatatgata agataatggg gtcaaaactg ttaaggggta atgtaataat      1140
77      agggactaag tttgcccagg agcagtgaac cataacaacc aatcagcagg tatgatttac      1200
78      tggtcacctg tttaaaagca aacatcttat tggttgctat gggttactgc ttctgggcaa      1260
79      aatgtgtgcc tcataggggg gttagtgtgt tgtgtactga ataaattgta tttatttcac      1320
80      tgttacaaaa aaaaaaaaaa
82 <210> SEQ ID NO: 3
83 <211> LENGTH: 318
84 <212> TYPE: PRT
85 <213> ORGANISM: Xenopus frazzled
86 <400> SEQUENCE: 3
87      Met Ser Arg Thr Arg Lys Val Asp Ser Leu Leu Leu Leu Ala Ile Pro
88      1          5          10          15
89      Gly Leu Ala Leu Leu Leu Leu Pro Asn Ala Tyr Cys Ala Ser Cys Glu
90          20          25          30
91      Pro Val Arg Ile Pro Met Cys Lys Ser Met Pro Trp Asn Met Thr Lys
92          35          40          45
93      Met Pro Asn His Leu His His Ser Thr Gln Ala Asn Ala Ile Leu Ala
94          50          55          60
95      Ile Glu Gln Phe Glu Gly Leu Leu Thr Thr Glu Cys Ser Gln Asp Leu

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Input Set : N:\Crf3\Refhold\I903188.raw

Output Set: N:\CRF3\03282002\I903188A.raw

96	65	70	75	80
97	Leu Phe Phe Leu Cys Ala Met Tyr Ala Pro Ile Cys Thr Ile Asp Phe			
98		85	90	95
99	Gln His Glu Pro Ile Lys Pro Cys Lys Ser Val Cys Glu Arg Ala Arg			
100		100	105	110
101	Ala Gly Cys Glu Pro Ile Leu Ile Lys Tyr Arg His Thr Trp Pro Glu			
102		115	120	125
103	Ser Leu Ala Cys Glu Glu Leu Pro Val Tyr Asp Arg Gly Val Cys Ile			
104		130	135	140
105	Ser Pro Glu Ala Ile Val Thr Val Glu Gln Gly Thr Asp Ser Met Pro			
106		145	150	155
107	Asp Phe Ser Met Asp Ser Asn Asn Gly Asn Cys Gly Ser Gly Arg Glu			
108		165	170	175
109	His Cys Lys Cys Lys Pro Met Lys Ala Thr Gln Lys Thr Tyr Leu Lys			
110		180	185	190
111	Asn Asn Tyr Asn Tyr Val Ile Arg Ala Lys Val Lys Glu Val Lys Val			
112		195	200	205
113	Lys Cys His Asp Ala Thr Ala Ile Val Glu Val Lys Glu Ile Leu Lys			
114		210	215	220
115	Ser Ser Leu Val Asn Ile Pro Lys Asp Thr Val Thr Leu Tyr Thr Asn			
116		225	230	235
117	Ser Gly Cys Leu Cys Pro Gln Leu Val Ala Asn Glu Glu Tyr Ile Ile			
118		245	250	255
119	Met Gly Tyr Glu Asp Lys Glu Arg Thr Arg Leu Leu Leu Val Glu Gly			
120		260	265	270
121	Ser Leu Ala Glu Lys Trp Arg Asp Arg Leu Ala Lys Lys Val Lys Arg			
122		275	280	285
123	Trp Asp Gln Lys Leu Arg Arg Pro Arg Lys Ser Lys Asp Pro Val Ala			
124		290	295	300
125	Pro Ile Pro Asn Lys Asn Ser Asn Ser Arg Gln Ala Arg Ser			
126		305	310	315
128	<210> SEQ ID NO: 4			
129	<211> LENGTH: 1875			
130	<212> TYPE: DNA			
131	<213> ORGANISM: Xenopus frazzled			
132	<400> SEQUENCE: 4			
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134	tggttgatttt gacacatgat tgattgcttt cagataggat tgaaggactt ggatttttat			120
135	ctaattctgc acttttaaata tatctgagta attgttcatt ttgtattgga tgggactaaa			180
136	gataaactta actccttgct tttagacttgcc cactaaacta taagggtggg tgagttgtag			240
137	ttgctttttac atgtgcccag attttccctg tattccctgt attccctcta aagtaagcct			300
138	acacatacag gttgggcaga ataacaatgt ctggaacaag gaaagtggac tcattactgc			360
139	tactggccat acctggactg gcgcttctct tattaccctaa tgcttactgt gcttcgtgtg			420
140	agcctgtgcg gatcccatg tgcaaatcta tgccatggaa catgaccaag atgcccacc			480
141	atctccacca cagcaactcaa gccaatgccca tcctggcaat tgaacagttt gaaggtttgc			540
142	tgaccactga atgtagccag gaccttttgt tctttctgtg tgccatgtat gccccattt			600
143	gtaccatcga tttccagcat gaaccaatta agccttgcaa gtccgtgtgc gaaagggcca			660
144	gggccggctg tgagcccatt ctcataaagt accggcacac ttggccagag agcctggcat			720
145	gtgaagagct gcccgatat gacagaggag tctgcattct cccagaggct atcgctcacag			780

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DATE: 03/28/2002

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Input Set : N:\Crif3\Refhold\I903188.raw

Output Set: N:\CRF3\03282002\I903188A.raw

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146  tggaacaagg aacagattca atgccagact tctccatgga ttcaaacaat ggaaattgcg      840
147  gaagcggcag ggagcactgt aaatgcaagc ccatgaaggc aacccaaaag acgtatctca      900
148  agaataatta caattatgta atcagagcaa aagtgaagaa ggtgaaagtg aaatgccacg      960
149  acgcaacagc aattgtggaa gtaaaggaga ttctcaagtc ttccctagtg aacattccta    1020
150  aagacacagt gacactgtac accaactcag gctgcttggt cccccagctt gttgccaatg    1080
151  aggaatacat aattatgggc tatgaagaca aagagcgtac caggcttcta ctagtggaag    1140
152  gatccttggc cgaaaaatgg agagatcgtc ttgctaagaa agtcaagcgc tgggatcaaa    1200
153  agcttcgacg tcccaggaaa agcaaagacc cctgggtccc aattcccaac aaaaacagca    1260
154  attccagaca agcgcgtagt tagactaacg gaaaggtgta tggaaactct atggactttg    1320
155  aaactaagat ttgcattggt ggaagagcaa aaaagaaatt gcactacagc acgttatatt    1380
156  ctattgttta ctacaagaag ctgggtttagt tgattgtagt tctcctttcc ttcttttttt    1440
157  ttataactat atttgcacgt gttcccaggc aattgtttta ttcaacttcc agtgacagag    1500
158  cagtgaactga atgtctcagc ctaaaagaagc tcaattcatt tctgatcaac taatgggtgac    1560
159  aagtgtttga tacttgggga aagtgaacta attgcaatgg taaatcagag aaaagttgac    1620
160  caatgtttgct tttcctgtag atgaacaagt gagagatcac atttaaatga tgatcacttt    1680
161  ccatttaata ctttcagcag ttttagttag atgacatgta ggatgcacct aaatctaaat    1740
162  attttatcat aaatgaagag ctgggtttaga ctgtatgggc actgttggga aggtaaatgc    1800
163  ctactttgtc aattctgttt taaaaattgc ctaaataaat attaagtcct aaataaaaaa    1860
164  aaaaaaaaaa aaaaa
165
166 <210> SEQ ID NO: 5
167 <211> LENGTH: 896
168 <212> TYPE: PRT
169 <213> ORGANISM: Xenopus
170 <400> SEQUENCE: 5
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172    1             5             10             15
173  Val Leu Gln Thr Asp Cys Glu Ile Ala Gln Tyr Tyr Ile Asp Glu Glu
174             20             25             30
175  Glu Pro Pro Gly Thr Val Ile Ala Val Leu Ser Gln His Ser Ile Phe
176             35             40             45
177  Asn Thr Thr Asp Ile Pro Ala Thr Asn Phe Arg Leu Met Lys Gln Phe
178             50             55             60
179  Asn Asn Ser Leu Ile Gly Val Arg Glu Ser Asp Gly Gln Leu Ser Ile
180             65             70             75             80
181  Met Glu Arg Ile Asp Arg Glu Gln Ile Cys Arg Gln Ser Leu His Cys
182             85             90             95
183  Asn Leu Ala Leu Asp Val Val Ser Phe Ser Lys Gly His Phe Lys Leu
184             100            105            110
185  Leu Asn Val Lys Val Glu Val Arg Asp Ile Asn Asp His Ser Pro His
186             115            120            125
187  Phe Pro Ser Glu Ile Met His Val Glu Val Ser Glu Ser Ser Ser Val
188             130            135            140
189  Gly Thr Arg Ile Pro Leu Glu Ile Ala Ile Asp Glu Asp Val Gly Ser
190             145            150            155            160
191  Asn Ser Ile Gln Asn Phe Gln Ile Ser Asn Asn Ser His Phe Ser Ile
192             165            170            175
193  Asp Val Leu Thr Arg Ala Asp Gly Val Lys Tyr Ala Asp Leu Val Leu
194             180            185            190
195  Met Arg Glu Leu Asp Arg Glu Ile Gln Pro Thr Tyr Ile Met Glu Leu

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Input Set : N:\Crf3\Refhold\I903188.raw

Output Set: N:\CRF3\03282002\I903188A.raw

196		195		200		205	
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198	210				215		
199	Asn	Ile	Arg	Val	Leu	Asp	Phe
200	225				230		
201	Ser	Thr	Ile	Ala	Val	Asp	Leu
202					245		
203	Leu	Leu	Glu	Leu	His	Ala	Thr
204					260		
205	Ile	Val	Tyr	Gly	Phe	Ser	Thr
206	275				280		
207	Phe	Lys	Ile	Asn	Ser	Arg	Thr
208	290				295		
209	Asp	Phe	Glu	Thr	Lys	Gln	Thr
210	305				310		
211	Leu	Gly	Pro	Asn	Pro	Leu	Thr
212					325		
213	Leu	Asp	Val	Asn	Asp	Asn	Thr
214					340		
215	Thr	Val	Asn	Ala	Gly	Val	Ala
216					355		
217	Asn	Phe	Ile	Ala	Leu	Ile	Ser
218	370				375		
219	Gly	Gln	Val	Arg	Cys	Thr	Leu
220	385				390		
221	Gln	Ala	Tyr	Glu	Asp	Ser	Tyr
222					405		
223	Arg	Glu	Asn	Ile	Ala	Ala	Tyr
224					420		
225	Gly	Phe	Pro	Ser	Leu	Lys	Thr
226					435		
227	Asp	Glu	Asn	Asp	Asn	Ala	Pro
228	450				455		
229	Ser	Ile	Leu	Glu	Asn	Asn	Ala
230	465				470		
231	Ala	Arg	Asp	Ser	Asp	Ser	Asp
232					485		
233	Val	Asp	Ala	Lys	Val	Met	Gly
234					500		
235	Asp	Ala	Asp	Ser	Gly	Val	Leu
236					515		
237	Lys	Leu	Lys	Gln	Leu	Asp	Phe
238					530		
239	Pro	Gln	Leu	Ser	Thr	Arg	Val
240	545				550		
241	Asn	Asp	Asn	Cys	Pro	Val	Ile
242					565		
243	Gly	Glu	Val	Leu	Leu	Pro	Ile
244					580		